

Amendments to the Claims

This listing will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (Currently amended) A fluid sensor employing a mechanical resonator, comprising: a resonator portion adapted for resonating in a fluid under test; and an electrical connection between the resonator portion and a source of an input signal, including at least one electrode that is at least partially covered by a dielectric material; wherein the resonator portion, the electrical connection or both includes a base material and a performance-tuning material that is different from the base material, is relatively hydrophobic, and exhibits a porosity of less than about 5% of its volume.
2. (Original) A sensor according to claim 1, wherein the resonator portion includes at least one tine.
3. (Currently amended) A sensor according to claim 2, wherein the resonator portion includes at least two tines ~~for defining a tuning fork~~.
4. (Currently amended) A sensor according to claim 1, wherein the resonator portion includes at least two tines ~~for defining a tuning fork~~ and the tines are joined together at a cross member to define form a generally "H" shaped structure.
5. (Original) A sensor according to claim 3, wherein the base material of the resonator portion includes a piezoelectric material, an electrostrictive material, a magnetostriictive

material, a piezoresistive material, an elasto-optic material, an anisotropic material, or combinations thereof and the electrical connection includes at least one electrode formed of a metal selected from gold, platinum, silver, chromium, aluminum, nickel, titanium or mixtures thereof.

6. (Currently amended) A sensor according to claim 5, wherein the base material of the resonator portion includes quartz, lithium niobate, zinc oxide, lead zirconate titanate (PZT), a gallio-germanate[[s]], diomignite (lithium tetraborate), bismuth germanium oxide, gallium phosphate, gallium nitride, aluminum nitride or combinations thereof.

7. (Currently amended) A sensor according to claim 5, wherein the performance-tuning material includes a material selected from the group consisting of polymers, ceramics, metals, metal carbides, ~~or~~ metal nitrides, diamond, diamond-like carbon, and combinations thereof.

8. (Currently amended) A sensor according to claim 6, wherein the performance-tuning material includes a material selected from the group consisting of polymers, ceramics, metals, metal carbides, ~~or~~ metal nitrides, diamond, diamond-like carbon, and combinations thereof.

9. (Currently amended) A sensor according to claim 7, wherein the performance tuning material: (i) includes a layer partially overlying a base resonator material; or (ii) includes a layer entirely overlying a base resonator material; or (iii) is an intermediate layer in the resonator; or (iv) is dispersed within ~~the~~ a base material; or (v) includes any combination[[s]] thereof of (i), (ii), (iii) and (iv).

10. (Currently amended) A fluid sensor employing a mechanical resonator, comprising: a resonator portion including at least two tines adapted for resonating in a fluid under test; and an electrical connection including at least one electrode formed of a metal selected from gold, platinum, silver, chromium, aluminum, nickel, titanium or mixtures thereof between the resonator portion and a source of an input signal, wherein the resonator portion includes: a doped or undoped base material that exhibits a dielectric constant that is substantially constant over a temperature range ~~of~~ from at least about 0 °C to about 100 °C., and is selected from the group consisting of quartz, lithium niobate, zinc oxide, lead zirconate titanate (PZT), gallo-germanates (e.g., Langasite (La_{0.3}Ga_{0.5}SiO₄), Langanite, or Langatate), diomignite (lithium tetraborate), bismuth germanium oxide, gallium phosphate, gallium nitride, aluminum nitride or combinations thereof; and a performance-tuning material that is relatively hydrophobic, exhibits a porosity of less than about 5% of its volume, is stable at about 150 °C, is different from the base material and is selected from the group consisting of polymers, ceramics, metals, metal carbides or nitrides, diamond, diamond-like carbon, and combinations thereof.

11. (Original) The sensor according to claim 10, wherein the at least one electrode is at least partially covered by a dielectric material.

12. (Original) The sensor according to claim 11, wherein the base material is quartz.

13. (Original) The sensor according to claim 10, wherein the base material is lithium niobate.

14. (Original) The sensor according to claim 10, wherein the base material is PZT.

15. (Original) The sensor according to claim 10, wherein the base material is a gallo-germanate.

16. (Original) The sensor according to claim 10, wherein the performance-tuning material includes one or a combination of two or more materials selected from the group consisting of fluoropolymers, silicones, silanes, polyolefins, carbides, nitrides, oxides, diamond, diamond-like carbon, and combinations thereof.

17. (Currently amended) The sensor according to claim 10, wherein the performance-tuning material includes one or a combination of two or more materials selected from the group consisting of polytetrafluoroethylene, fluorosilicone, polyethylene, polypropylene, silicon carbide, silicon nitride, diamond, diamond-like carbon, ~~and combinations thereof~~.

18. (Currently amended) The sensor according to claim 6, wherein the performance-tuning material includes one or a combination of two or more materials selected from the group consisting of polytetrafluoroethylene, fluorosilicone, polyethylene, polypropylene, silicon carbide, silicon nitride, diamond, diamond-like carbon, ~~and combinations thereof~~.

19. (Original) The sensor according to claim 10, wherein the performance-tuning material includes a fluoropolymer.

20. (Original) The sensor according to claim 10, wherein the performance-tuning material includes a ceramic.

21. (Original) The sensor according to claim 10, wherein the performance-tuning material includes a metal nitride.

22. (Original) The sensor according to claim 10, wherein the resonator portion formed from a wafer.

23. (Currently amended) The sensor according to claim 11, wherein the performance-tuning material is ~~employed as~~ a layer that is continuous or intermittent, along edges of the resonator base material, within the interior of the resonator base material, or a combination thereof.

24. (Currently amended) A method for making a resonator, comprising: a) forming a plurality of resonators on a common substrate; the resonators including: a resonator portion adapted for resonating in a fluid; and an electrical connection including at least one electrode formed of a metal selected from gold, platinum, silver, chromium, aluminum, nickel, titanium or mixtures thereof between the resonator portion and a source of an input signal, wherein the resonator portion includes: a doped or undoped base material that exhibits a dielectric constant that is substantially constant over a temperature range ~~of~~ from at least about 0 °C to about 100 °C, and is selected from quartz, lithium niobate, zinc oxide, lead zirconate titanate (PZT), gallo-germanates, diomignite (lithium tetraborate), bismuth germanium oxide, gallium phosphate, gallium nitride, aluminum nitride or combinations thereof; and a performance-tuning material that is different from the base material and is

selected from the group consisting of polymers, ceramics, metals, metal carbides or nitrides, diamond, diamond-like carbon, and combinations thereof; and b) separating the resonators from each other.

25. (Currently amended) The method according to claim [[26]] 24, further comprising: c) at least partially covering at least one electrode with a dielectric.

26. (Currently amended) The method according to claim [[27]] 25, wherein the performance tuning material is resistant to absorption of oils.

27-28. (Cancelled.)